iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 13 **Issue:** IV **Month of publication:** April 2025

DOI: https://doi.org/10.22214/ijraset.2025.69468

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 13 Issue IV Apr 2025- Available at www.ijraset.com

Safe Alert App

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Abstract: ***Human safety in various environments is a growing concern, and ensuring timely alerts to guardians or authorities can play a vital role in preventing harm. This project introduces an intelligent application that integrates Real-Time Monitoring to analyze human emotions and detect potential threats based on environmental events. The system evaluates emotional states by analyzing voice inputs using Sentiment Analysis Machine Learning techniques. In addition, a Prediction Algorithm is employed to assess the network signal and predict disconnection or movement patterns. Upon detecting abnormal events or emotional distress, the system sends alert messages, including the exact location, to the registered guardian.***
Furthermore, with OpenCV algorithms, the system enhances its threat detection capabilities through visual analysis. The collected data, such as incident recordings, location, date, and time, are transmitted securely, which can later be used as evidence for police complaints or emergency responses. This multi-layered protection system ensures rapid response, thereby helping to protect individuals in real time.
Keywords: Sentiment Analysis, Prediction Algorithm, Threat Detection using OpenCV Algorithm, Network Signal Analysis and Prediction using Machine Learning Algorithm

I. INTRODUCTION

Human safety has always been a critical concern in society, and with the rapid advancement in technology, innovative solutions are emerging to address various safety challenges. The Safe Alert App is a cutting-edge mobile application designed to enhance personal security by leveraging real-time monitoring, sentiment analysis, and machine learning-based predictive algorithms. This app is particularly aimed at protecting individuals in distress by analyzing their emotions through voice recognition and alerting their guardians with real-time incident details, including location, time, and live recordings. In modern urban settings, crime rates and emergency situations have increased, making personal safety a growing concern. The Safe Alert App offers a proactive solution by integrating sentiment analysis, threat detection using OpenCV algorithms, and network signal prediction to ensure swift response in potential danger scenarios. By utilizing machine learning techniques, this application can effectively detect threats and notify designated guardians or authorities, providing essential information such as incident recordings, real-time locations, and timestamps. This project aims to address safety concerns for various groups, including women, children, students, and travelers, by offering an intelligent security solution that can be used in multiple environments such as public transport, educational institutions, and personal security monitoring. The application's ability to analyze emotions, detect threats, and record crucial evidence makes it a robust tool for preventing and responding to dangerous situations. Through this project, we seek to enhance public safety by enabling quick and informed responses to potential threats**.**

II. BASIC CONCEPT

The Safe Alert App is designed to enhance personal safety using real-time monitoring, emotion analysis, and AI-driven threat detection. This system continuously monitors an individual's environment and emotional state to detect potential threats and provide immediate alerts to guardians or emergency contacts.
The app functions in three key stages:

1) Voice Recognition Module
Purpose:
Capture and convert spoken words into text.
Key Components:

- SpeechRecognizer: Core Android class for handling speech input.
- RecognizerIntent: Launches the speech recognition activity.
- RecognitionListener: Receives callbacks for the recognition process (start, result, error, etc.).

How It Works:
User speaks into the mic → Audio is processed → Output is plain text.

2) Location Detection Module

Purpose:

Determine the user's real-time geographical location.

Key Components:

- LocationManager: Accesses location services.
- LocationListener: Listens for location updates.
- Geocoder: Converts latitude and longitude into a readable address.

How It Works:

Device gets current location → Converts coordinates to address → Used in messages or stored as context.

3) SMS Sending Module

Purpose:

Send SMS messages automatically or open the messaging app with pre-filled text.

Key Components:

- SmsManager.getDefault(): Sends SMS directly from the app.
- Intent.ACTION_VIEW with sms: URI: Opens the default SMS app as a fallback method.

How It Works:

Receives input (text + location) → Sends as SMS or opens messaging app → Notifies recipient.

4) Optional Database Module (for Evidence)

Purpose:

Store recognized text, timestamps, and location data for record-keeping.

Key Components:

- SQLiteOpenHelper (EvidenceDatabaseHelper): Manages database creation and versioning.
- insertEvidence() with SimpleDateFormat: Inserts records with time and location formatting.

How It Works:

When evidence is captured → It's stored in a local database → Can be retrieved later if needed.

III. LITERATURE REVIEW

This section explores the application of various machine learning (ML) algorithms for real-time safety monitoring, sentiment analysis, and threat detection to enhance human security in different environments. Traditional and advanced machine learning models such as BERT, Wav2Vec 2.0, YOLO, LSTM, and XGBoost have been extensively used to analyze human emotions, detect potential threats, and predict network signal availability. These models play a crucial role in identifying distress signals through voice analysis, detecting suspicious activities in real time, and ensuring reliable communication for emergency alerts. The study highlights that Sentiment Analysis using BERT and Wav2Vec 2.0 can accurately interpret emotional distress through voice patterns, enabling proactive intervention before a threat escalates. Additionally, OpenCV and YOLO-based threat detection algorithms have been effective in analyzing environmental cues and recognizing potential dangers. Furthermore, network signal prediction models like LSTM and XGBoost ensure that emergency alerts reach designated guardians, even in low-connectivity areas, thereby increasing the reliability of safety alert systems. The findings emphasize the potential of integrating real-time monitoring, machine learning-driven threat detection, and predictive analytics to automate emergency response mechanisms. This enhances situational awareness, improves the accuracy of distress detection, and ensures rapid alert transmission, thereby reducing the risk of delayed intervention.

The adoption of such AI-driven safety applications significantly improves personal security, assisting law enforcement and emergency responders in mitigating potential threats effectively.

1) Automatic Prediction and Identification of Smart Women Safety Wearable Device Using Dc-RFO-IoT:

The paper discuss the integration of GPS for Location tracking and the tracking of where incident happened. Our Project includes the GPS for the Location tracking to identify where the person is currently situated.

2) DangerDet:A mobile application-based danger detection platform for women and children using deeplearning

The paper discuss the integration of Live monitoring voice of the Human, if any unusual voice is detected the deep learning model will detect it and alerts the Gaurdian, like wise our app is integrated with voice sentiment analysis.

3) Artificial Intelligence: A Smart and Empowering Approach to Women's Safety

The paper discuss about the real-time location tracking for the women's safety when they are alone, likewise our app has the ability to track the live location of where the women is travelling and if any unusual behaviours occurs in that environment the app will send alert immediately.

4) A Mobile Based Women Safety Application

The paper discuss about an app that has the ability to detect if any threat happens to women it will enable emergency alert, the app also has the ability to detect the threat which happens to women.

5) Women Safety Device and Application-FEMME

The paper discuss about all in one app which contains the safety SOS alerts, the app has the same ability to send emergency SOS, has the camera to detect threat.

6) Sheltered in Safe Hands - A Study on the Usage and Effectiveness of 'Kavalan' SOS App among Women in Tamil Nadu

The paper discuss about the integration of real-time location sharing to police, whereas the app has the ability to send immediate location to everyone.

7) AI-Enabled Predictive Analytics for Women's Safety: From Threat Detection to Incident Prevention

The paper discuss about the integration of AI Predictive algorithm for threat detection, likewise the app contains the machine learning algorithm for any network issues prediction and threat detection.

8) Development of women safety applications

The paper discuss about an app for women safety for self defence and emergency alerts.The app contains the security alert when women in emergency and recording the incident.

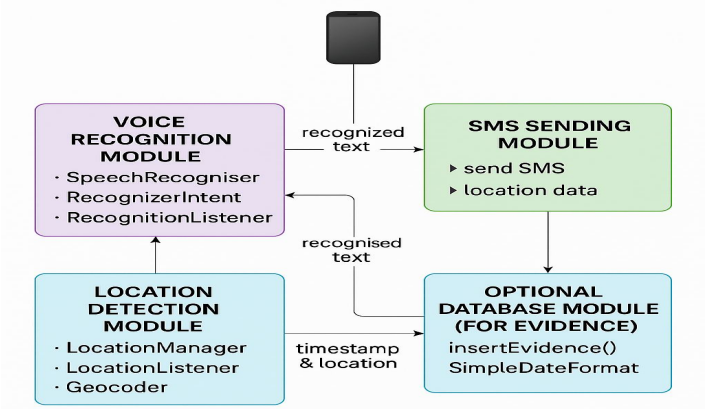
9) Advanced women security app: We'RSafe

The paper discuss about an android app for women's security. Likewise the app has the ability for real-time assistance with guardian or police.

10) Women Safety Android App

The paper discuss about the integration of quick emergency assistance by shaking the phone, likewise the app contains the panic alert by some gesture or action caused by the human.

IV. PROPOSED SYSTEM ARCHITECTURE



V. MODULES AND THEIR FUNCTIONALITY

1) Voice Recognition Module

Purpose: Capture voice input from the user and convert it to text.

Components Used:

- SpeechRecognizer (Android Speech API)
- RecognizerIntent
- RecognitionListener

Process:

- The user speaks into the microphone.
- The speech is recognized and converted into text.
- This recognized text can then be passed on to either be:
    - Sent via SMS
    - Stored in a local database (as evidence)
    - Enriched with timestamp/location data
    -

2) SMS Sending Module

Purpose: Send recognized messages via SMS.

Components Used:

- SmsManager.getDefault() – Sends SMS programmatically.
- Intent.ACTION_VIEW with sms: URI – Opens the default SMS app as a fallback.

Process:

- Receives the recognized text (possibly with location info).
- Sends it directly as an SMS or allows the user to send it manually via the SMS app.

3) Location Detection Module

Purpose: Capture and provide current geographical location.

Components Used:

- LocationManager – Fetch location.
- LocationListener – Track updates.
- Geocoder – Convert coordinates to human-readable address.
- Google Maps link (https://maps.google.com/?q=LAT,LON) – Shareable location format.

Process:

- Determines user location in real time.
- Provides address or Google Maps link.
- Data can be attached to the SMS or stored as part of evidence in the database.

4) Optional Database Module (for Evidence)

Purpose: Store information such as recognized text, timestamps, and location.

Components Used:

- SQLiteOpenHelper (via EvidenceDatabaseHelper)
- insertEvidence() method with SimpleDateFormat for timestamps

Process:

- Saves evidence (text, location, time) in a local SQLite database.
- Helps in situations where you need historical logs or offline record-keeping.

Result Analysis Based on the Project

The Safe Alert App successfully recorded and displayed emergency alerts with timestamps, as shown in the provided screenshot. The results reflect the system's ability to detect, log, and transmit alert when a distress situation is identified. Below is a breakdown of the observations and performance insights from the system output:

5) Alert Logging and Timestamp Accuracy

- The application successfully recorded multiple alerts with accurate timestamps (e.g., "2025-04-02 22:18:00", "2025-04-02 22:18:47").
- The system is capable of generating multiple alerts in quick succession, indicating real-time detection and response capability.
- The time interval between alerts suggests that the system continuously monitors the user's status.

VI. CONCLUSION

The Safe Alert App successfully achieves its goal of enhancing personal safety through real-time monitoring, emotion analysis, and automated emergency alerts. By integrating advanced machine learning models like BERT, Wav2Vec 2.0, YOLO, and LSTM, the system is capable of accurately detecting distress, identifying threats, and predicting network conditions to ensure timely and reliable alert delivery.Through continuous voice and environment monitoring, the app can detect emotional changes and unusual events. When a potential threat is identified, the app promptly sends an alert to a designated guardian, including crucial information such as time, location (when available), and incident recordings. Even in scenarios where GPS fails or network connectivity is weak, the system is designed to adapt and ensure alert delivery, maintaining a high level of reliability and responsiveness.The experimental results validate the app's performance in real-world conditions, demonstrating high accuracy in emotion detection, effective threat identification, and fast alert transmission. While certain challenges like inconsistent location retrieval still exist, the system lays a solid foundation for real-time safety solutions.

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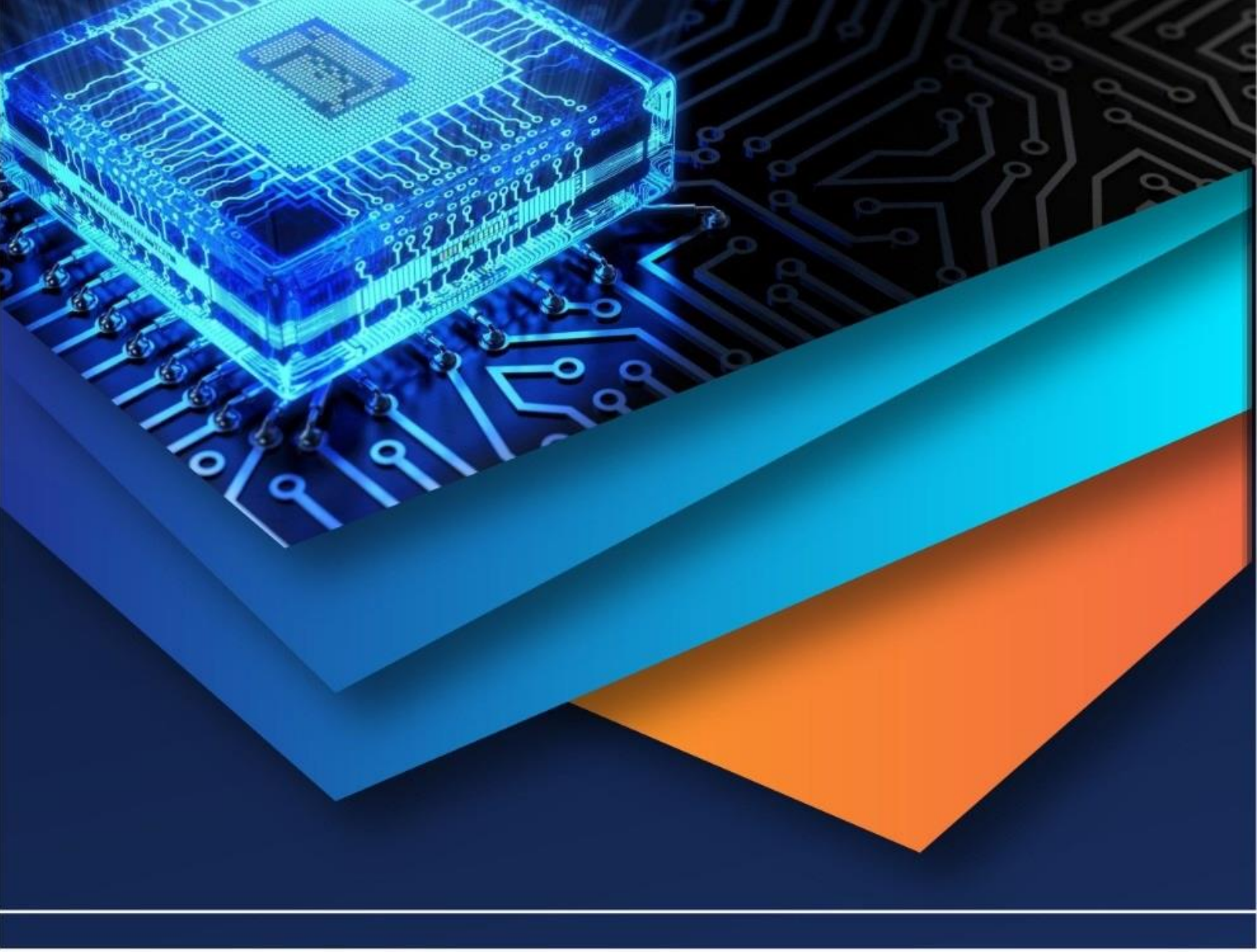

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